

Increasing the Productivity and Production of the Apparel Industry Using Social Media Platform

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Abstract - This study investigates the possibilities of using social media platforms to raise output and productivity in the apparel industry. Consumer behavior has a significant impact on the fashion sector, thus businesses must incorporate social media into their operations. The study looks at effective social media strategies and campaigns used by clothing companies to evaluate their effects on output and productivity. The proposal offers suggestions on how businesses use social media platforms to create brands, interact with customers, and boost sales. Large amounts of unstructured data, including user reviews, comments, and hashtags, will be collected, and analyzed via social media sites using Natural Language Processing (NLP) techniques. Topic modeling and sentiment analysis, two techniques made possible by NLP, will assist discover significant themes and customer impressions. Garment firms may improve their social media tactics and ultimately increase efficiency and output by evaluating trends and patterns in the data.

Keywords: Natural Language Processing (NLP), unstructured data, topic modeling, sentiment analysis, trends, patterns, apparel sector, social media, productivity, output, consumer behavior, and social media campaigns.

I. INTRODUCTION

In many different industries and areas of our daily life, the garment business is essential. New technologies like natural language processing (NLP) and machine learning have been used to spot patterns in the garment sector as software engineers concentrate on producing software that functions as intended for all industries. To quickly identify emerging trends, these systems examine a tremendous quantity of data, including social media trends, fashion blogs, and e-commerce sales data. While this method is still useful, researchers and developers are always looking for better and more dependable ways to identify trends and work with stakeholders in the garment sector. The fashion business, designers, influencers, and celebrities frequently determine fashion trends, however various people may have preferences that don't always correspond to popular fashions. While some could favor

alternative or classic fashion, others would put comfort before style. In the end, fashion is subjective.

The productivity of the apparel business can be impacted by fashion trends in both positive and negative ways. Popular trends can raise the demand for clothing styles, boosting output and sales. Design trends motivate designers to develop fresh product lines that follow the newest fashions, increasing output and profit. Short-lived trends, however, might cause an abrupt decline in demand, which would lower output and revenue. Higher manufacturing costs may also be a result of certain trends, such as the use of pricey materials and labor-intensive processes. Unsold inventory may result from a trend that doesn't take off as anticipated, which will have a negative effect on production and earnings. Building a social media platform for communication inside the garment business has been proposed as a solution to these problems. By establishing a trustworthy and user-friendly environment, this platform seeks to produce trend models that are more individually tailored and effective. Phases of the system would include extracting captions, comments, and texts from community feeds, analyzing them with natural language processing (NLP), and employing image recognition software to examine images of clothing products.[1] To better understand consumer preferences and enhance product development and marketing tactics, clothing companies can utilize NLP to analyze user comments and evaluations of clothing products. By assisting customers with product selection, sizing, and other concerns, a chatbot employing NLP can improve customer service and satisfaction.[2] The garment sector also has several issues that must be resolved. Due to larger audiences and more robust marketing expenditures, local brands may find it difficult to compete with multinational brands. A brand's perception can be severely impacted by low-quality photos, which emphasizes the value of spending money on high-quality images.[3] Fast fashion trends may lead to a substantial amount of clothing waste, which has an impact on the environment and employees. Low material quality might affect total value and consumer satisfaction due to high taxes and production expenses. Transparency, traceability, and sustainability are crucial for overcoming these obstacles. Brands may do this by implementing technologies like

artificial intelligence (AI), blockchain, and data analytics to increase supply chain transparency and traceability. Customers' ethical decision-making can be influenced by educating them about sustainable practices and working with groups who are concerned with sustainability.[4] In order to create ethical and environmentally sustainable supply chains, the apparel business relies heavily on collaboration with brands, consumers, and others. For clothing companies, social media presents important chances to increase output, effectiveness, and revenues. Companies may promote products, interact with customers, learn about trends, and enhance different parts of their business by using social media effectively.

II. LITERATURE REVIEW

This literature review aims to identify the existing research that searched into the main key components of this research. Natural language processing (NLP), an area of artificial intelligence (AI), is used extensively in many industries, including apparel manufacturing. NLP may be utilized in the garment sector to automate a variety of processes, such as pattern design, quality control, and assembly instructions. NLP can be utilized to increase productivity and production in the apparel manufacturing sector by automating business processes, enhancing communication, and streamlining workflows. The entire world is now based on automation so automated workflow for manufacturing apparel processes orders and extracts relevant data from emails using natural language processing (NLP). The proposed approach extracted relevant data with a 95% accuracy rate.[5] Natural language processing (NLP) technologies are used in the automated apparel manufacturing workflow process to improve the accuracy and efficiency of the industry. There are programs that analyze consumer reviews of clothing fit using natural language processing and makes suggestions for improvement. In recognizing customer complaints about apparel fitting, the suggested system had an accuracy rate of 89%.[6] To increase the precision and effectiveness of the fitting process, natural language processing (NLP) can be applied for garment fitting analysis. For accurate estimates of how a dress will fit for a particular body type, NLP algorithms can examine natural language descriptions of body measurements and apparel specs. The production of customized recommendations for apparel changes is another way that NLP is used in the analysis of garment fitting. NLP algorithms can produce recommendations for adjustments to improve the fit of an outfit for a certain body type by analyzing natural language descriptions of body measurements and apparel specs. Research teams proposed the text analytics-based approach to supplier selection in the apparel industry. A detailed analysis of NLP's applicability in fashion e-commerce is published,

including chatbots, customer reviews, and product descriptions. The authors highlight NLP's ability to improve sales and customer experience. NLP can be used to improve the search capabilities of shopping websites. NLP can assist in producing more relevant results by analyzing the customer's queries. Personalized product recommendations can be provided to customers using NLP and those based on their search habits and interests.[7] Chatbots can be used by fashion e-commerce companies to assist with customer care. Chatbots can be trained to comprehend customer inquiries and respond in natural language using NLP. This can speed up response times and boost client satisfaction. By examining customer reviews, social media posts, and other textual information about the products, text mining and natural language processing (NLP) can be utilized to forecast apparel sales. The sentiment of customer reviews and social media posts relating to apparel can be analyzed using text mining and NLP.[8] Companies may discover more about customer preferences and make the required adjustments to their products, designs, and marketing plans by identifying both positive and negative sentiments. The subjects that customers are discussing in their social media postings and reviews of the apparel products can be found using text mining and natural language processing (NLP). Businesses can create products that suit to their target market's demands and preferences by recognizing the subjects of interest.[9]

As social media platforms have been increasingly integrated into business operations, the fashion industry has experienced an important change in recent years. In addition to altering how apparel companies' market and promote their fashion items, the rise of social media has also created important chances to increase productivity and production through the study of user patterns and the distribution of specific insight. The interplay between the apparel industry and social media platforms has proven to be symbiotic, as both entities leverage each other's strengths. [10] Emphasize how social media platforms allow garment manufacturers to exhibit their items in a unique way, encouraging interactions with customers. The ability to examine user trends and behaviors is one of the key benefits of combining social media into the garment sector. Underline that garment firms may acquire significant insights into customer preferences, and new trends by utilizing the massive quantity of data collected through customer interactions [11]. Social media makes it easier to send consumers individualized information, which is a key factor in increasing customer engagement. It's crucial to use social media to give material that is customized depending on interests and previous interactions. By offering products that are in line with user preferences, garment firms may increase customer satisfaction and income.[12]. For businesses, including those in the garment industry, social media is essential. It increases effectiveness and production. It

increases sales and awareness and is particularly useful in marketing and brand promotion. Research supports its efficacy in increasing brand awareness and consumer buying intent. Similarly, [13] found that social media can be used to improve brand equity and increase consumer purchase intention.

Teams, suppliers, and customers may communicate and work together more easily thanks to social media. Platforms make it possible to share information, improve workflows, cut down on errors, and increase customer satisfaction.[9]social media facilitates supply chain management, improves collaboration in the fashion industry, and provides data-driven consumer trend and product improvement insights. [14] Found that social media analytics can be an effective tool for understanding consumer sentiment and preferences in the apparel industry. Similarly found that social media analytics can be used to analyze key opinion leaders (KOLs) and consumers on WeChat. Social media can also be used to improve supply chain management. [15] Conducted a literature review on social media usage in supply chain management and found that social media can be used to improve communication, collaboration, and information sharing among supply chain partners. [16] Similarly conducted a systematic review on social media in supply chain management and found that social media can be used to improve supply chain visibility, traceability, and responsiveness.

Finally, social media can be used to engage with customers and gather feedback on products and services. By using social media platforms to connect with customers and solicit their input, companies can improve product design and customer satisfaction. [17] Conducted a review and research agenda on customer engagement with brands in social media and found that social media can be an effective tool for building customer loyalty and improving brand image. [18] Similarly found that social media marketing can be used to improve customer engagement in the apparel industry.

According to research, social media can boost efficiency and productivity in the garment sector. To fully comprehend how something operates, more study is necessary. By examining how social media affects productivity and efficiency in the garment production process, this study tries to close this gap. For a business to succeed, understanding client behavior is essential. This study increases client efficiency and pleasure by scrutinizing interactions, preferences, and problems. Customer productivity and effectiveness are further increased by adapting goods based on user behavior.[19]Customer testimonials provide crucial information about experiences and levels of satisfaction. Businesses use this data to identify areas for improvement and improve their offers. Additionally, incorporating customer

input into marketing increases the impact of messages by matching content with preferences of the target audience.[20]Productivity in product consumption is increased by using specific recommendations from research on consumer behavior. Companies that provide customized solutions based on customer preferences improve processes, promoting successful goal achievement. User productivity is further increased by prompt issue resolution made possible by proactive customer assistance and self-service options.[21]

III. METHODOLOGY

Develop a social media network that uses natural language processing to boost efficiency and production while decreasing costs for clothes manufacturers. Customers, designers, and producers are essential players in the platform, which focuses on local clothing items. The goal is to offer a platform for various stakeholders to connect, introduce new fashion trends and ideas, and sell their items via personalized profiles. The software may provide insights into the popularity of specific products and discover patterns by tracking user interactions such as comments, feedback, and captions. This assists manufacturers in monitoring trends, managing supplies, and cutting wasteful costs. Furthermore, the platform intends to address real-world issues like as product outages and waste by delivering specific trending product items that are unique to each user. The platform collects and analyzes web text data using natural language processing and image processing technologies, finding popular fashion ideas, styles, colors, and other design components. To discover and depict emerging fashion trends across time, the system applies trend prediction approaches based on the frequency and co-occurrence of extracted terms.

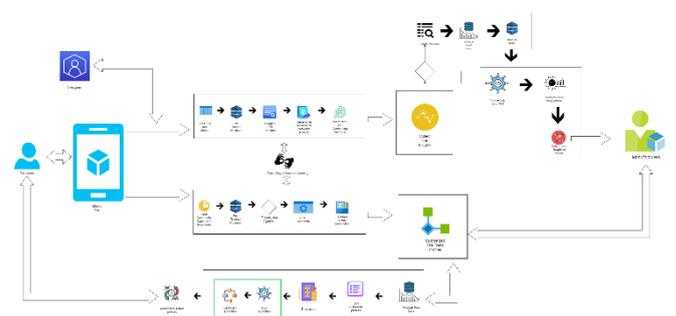


Figure 1: System Overview Diagram

A) Identifying the best performing fashion trends via personalized communities and on-demand chat bot service for fashion suggestions

Fashion businesses and designers find it difficult to pinpoint the most popular and significant trends because they are always changing. The ability to get insights into the

preferences and viewpoints of fashion enthusiasts through personalized communities makes it possible to determine the best-performing fashion trends. Understanding the preferences and choices within personalized communities can offer important information into figuring out which fashion trends will perform the best. Interaction and engagement within personalized communities provide a unique opportunity for direct insights. Users within these communities often share outfit inspirations, discuss emerging styles, and express their opinions on various fashion elements. This organic exchange of information generates a wealth of qualitative and quantitative data that can be mined to identify emerging patterns, preferences, and sentiment towards specific trends. The fashion industry is characterized by its dynamic nature, where trends swiftly evolve, and consumer preferences play a pivotal role. To address the challenges of pinpointing the best performing fashion trends, this research explores the potential of harnessing psychological frameworks within personalized communities. By amalgamating insights from personality traits and fashion preferences, this study seeks to provide a holistic approach to trend identification that goes beyond surface-level analysis.

The Myers-Briggs Type Indicator, a widely recognized psychological tool, categorizes individuals into distinct personality types based on their preferences in how they perceive the world and make decisions. By linking these personality types with fashion preferences, we aim to identify correlations between certain personality traits and specific fashion trends. For instance, individuals with extroverted and sensation-oriented traits may gravitate towards bold and vibrant fashion trends, while introverted and intuition-oriented individuals might prefer understated and timeless styles. Moreover, the integration of an on-demand chat bot service further enhances this methodology. The chat bot acts as a bridge between fashion enthusiasts and trend analysis, offering a seamless channel for users to seek personalized fashion suggestions and advice. By processing user queries, the chat bot gains insights into specific user preferences and context, which can be integrated into the trend analysis process. This dynamic interaction not only provides immediate value to users seeking fashion advice but also contributes to the refinement of the trend identification process over time. Once the data is collected from the Adiktplatform, then undertake thorough preprocessing steps to ensure its quality and usability. This involves handling missing values, removing duplicates, and standardizing data formats. Text processing techniques, including sentiment analysis, and named entity recognition, will be applied to extract valuable insights from captions and comments, enhancing the system's understanding of user sentiment and preferences. Incorporating technology into the methodology, design and develop an on-demand chat bot with integrated natural language processing (NLP)

capabilities. This chat bot will serve as a bridge between personalized fashion communities and trend analysis. The recommendation engine within the chat bot will utilize insights from fashion trend analysis and user preferences to provide real-time, personalized, and context-aware fashion suggestions.

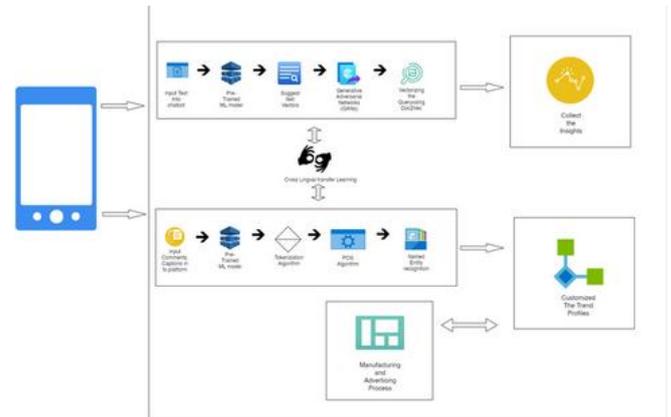


Figure 2: Component 01 system behavior diagram

B) Analyzing user trends and giving insights to the manufacturers and designers

The apparel industry is known for being a vibrant, fiercely competitive, and ever-evolving sector. They can strategically create and provide products that successfully meet the demands and expectations of their consumers by getting insights into customer preferences. Manufacturers and designers can keep their edge while establishing their standing in the industry before their competitors by taking a proactive strategy. The trend model which relates to this module was created by using two variables and predicts the age of the user base and according to the user base the manufacturers and designers provide their designs and products. Predictive analysis was used by this module and during the process of training the model, the data preprocessing was done by reducing the data set, removing unwanted columns, encoding string data to numerical values etc. Predictive analysis algorithms are capable of analyzing historical user information, including previous interactions, purchasing patterns, and engagement trends on social media platforms. They are then able to predict user preferences and behavior in the future. The ability to predict the goods or information customers are most likely to interact with helps apparel firms design their products and marketing efforts more precisely. Apparel firms may quickly adapt their production schedules to satisfy shifting consumer needs by spotting these patterns early. As a result, there is less chance of manufacturing out-of-date or unwelcome goods, which can assist in lower production costs. The material that is displayed to each user on social media can be customized using predictive algorithms that evaluate user data. Users may be shown material and

goods that are relevant to their past interactions and preferences. Personalization boosts user engagement and increases transition chances, which eventually increases output and revenue. By analyzing these contexts, implementing a vector model according to the most preferable designs and through that giving the insights to the manufacturers and designers is the main aim of this module.

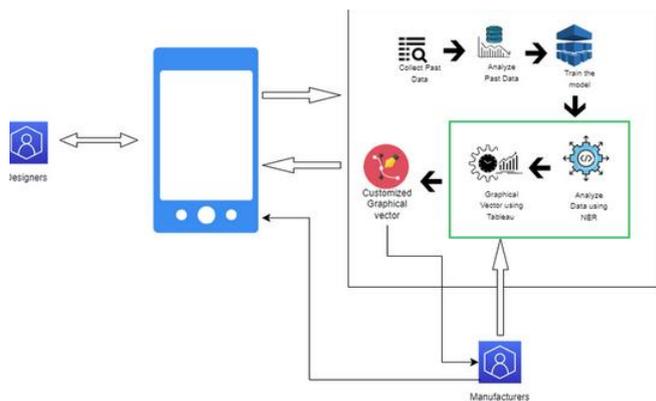


Figure 3: Component 02 system behavior diagram

C) Identifying best performing fashion trends via user interactions Module

Analysis of user patterns and information provision to manufacturers are the key objectives of this module. Examining reviews and comments, choosing the posts that are doing the best, and arranging by sorting by keywords are the essential tasks in this module. The system may use several text mining algorithms to examine the comments, reviews, and captions on a particular product. The stakeholders, the creators, producers, and buyers of the featured product can engage with the post through remarks, reviews, and captions on a particular post. That post is related to every record that is listed in the module and is broken up into several categories. For sorting enormous data sets, modern computer systems and sorting algorithms must be more time and space efficient.

In this module, trend models are created in a personalized manner by combining transform learning with NLP and IP. Look at each comment on the customized profile independently to distinguish between comments that are based on emotions and details. It suggests that it bases its projections for the future on past user behavior. People fall into two categories, for instance: those who only consider a dress's aesthetic appeal and brand name at first glance, and those who pay special attention to the dress's fabric, thread type, and final finish. The process begins with the manufacturer collecting data from multiple sources, such as customer ratings, reviews, and user-generated content, to study items that influence customer behavior. This information is then evaluated to determine customer preferences and behavior trends. Independent analysis of ratings, reviews, and user-generated content reveals customer sentiment and opinions. Models are created using the k-means technique and neural networks to acquire further insights. The k-means method aids in the grouping of comparable products and the identification of clusters of client preferences (K-mean algorithm), whereas neural networks generate a prediction model for individualized suggestions based on customer interests. The models are compared to see which one is the most accurate. Using the chosen model, an advertising campaign is developed, with a focus on social media platforms.

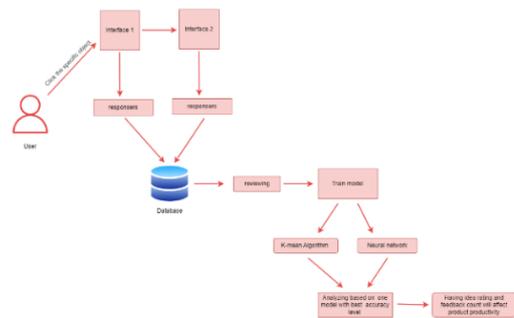


Figure 5: Component 04 system behavior diagram

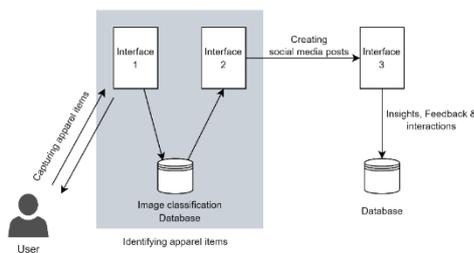


Figure 4: Component 03 system behavior diagram

D) Based on customer interaction optimize the feed

This module will analyze the creation of trend models to identify the most popular products and optimize their display. and user interaction model-based optimization of clothing

IV. RESULTS

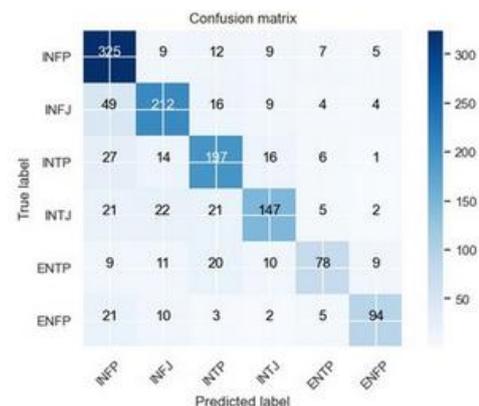


Figure 6: Quantitative Analysis of Personalities

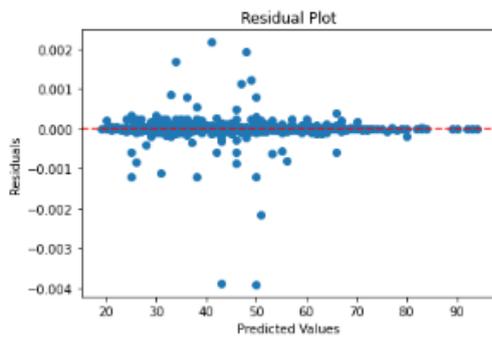


Figure 7: Predictive Analysis of the age

Figure 6 shows that the details of distribution of personalities according to the society they are came from by doing a Quantitative analysis and Figure 7 shows the predicted age where most of the people have rated a particular fashion item using Predicted analysis algorithm.

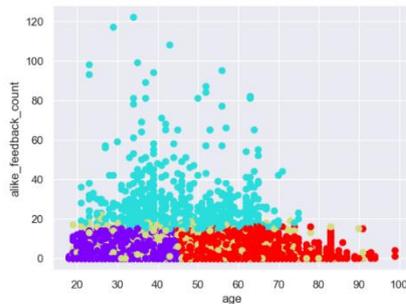


Figure 8: Two-dimensional neural network analysis

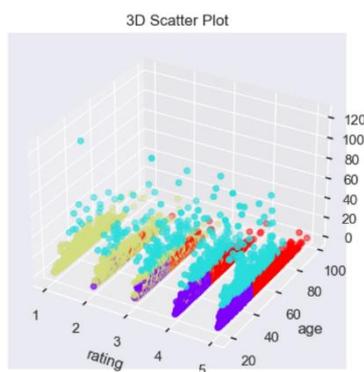


Figure 9: Three-dimensional neural network analysis

Visualizing interactions among three variables is aided with a 3D scatter plot. It aids in the discovery of intricate patterns that individual variable analysis can miss. It demonstrates, for instance, how "rating" varies among clusters about "age" and "alike_feedback_count." Data grouping is displayed using color-coded clusters, making it easier to identify related subpopulations. The figure identifies outliers—unusual data points that deviate from the norm—and data clusters, giving insights into certain circumstances. Correlations between "rating," "age," and "alike_feedback_count" can be deduced by looking at the

locations of the data points. Specific "age" and "rating" ranges show higher "alike_feedback_count" values, suggesting interaction effects. The 3D scatter plot, in summary, explains the connections between "rating," "age," and "alike_feedback_count." Circles with different colors indicate cluster membership, displaying varying interplay and exposing different patterns or groups.

V. CONCLUSION

The revolutionary potential of utilizing social media platforms to boost efficiency and production within the garment sector has been examined in this study paper, which concludes. It has become clear from a thorough investigation of several sub-functionalities that social media offers the apparel industry a wealth of opportunities. These opportunities include identifying top-performing fashion trends through personalized communities and chatbot services, analyzing user trends for insightful information, utilizing user interactions to identify emerging trends, and optimizing content based on customer engagement. The apparel business can not only remain ahead of changing fashion trends by using the potential of these functions, but it can also improve production procedures, cut waste, and ultimately increase productivity. Additionally, the understandings gained from user interactions give producers and designers priceless knowledge to create goods that appeal to their target market. The garment sector must continue to be innovative and adaptable as the digital world changes. The sector can open new doors for expansion and competitiveness by using social media platforms as a strategic tool. This study underlines the value of having a vibrant online presence and engaging with users while highlighting the enormous synergistic possibilities between technology and fashion. The garment sector will need to incorporate social media methods into its fundamental business practices to maintain success and growth in the always changing fashion landscape.

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REFERENCES

- [1] W. M. & T. H. Lim, "Social media as a tool for brand awareness and consumer purchase intention," 2016.
- [2] S. Y. K. M. S. & C. N. Park, "How do social media influence collaboration in the fashion industry? Journal of Fashion Marketing and Management: An International Journal," 2016.
- [3] W. W. S. L. a. M. L. ZX Guo, "Applications of Artificial Intelligence in the Apparel Industry," *Textile Research Journal*, p. 23, 2011.
- [4] N. Ahmad, "The Impact of Social Media on Fashion Industry," p. 8, 2015.
- [5] R. D. M. Soeken, "Natural Language Processing for Electronic Design," 2019.
- [6] S. Baier, "Analyzing Customer Feedback for Product Fit Prediction," 2019.
- [7] D. K. H. A. Papenmeier, "Dataset of Natural Language Queries for E-Commerce," 2023.
- [8] Y. L. R. Article, "Mining and Application of Tourism Online Review Text Based on," 2022.
- [9] A. K. A. S. R. Poteet, *Natural Language*, 2007.
- [10] H. W. D. Dong, *Multi-Task Learning for Multiple Language Translation*, 2015.
- [11] A. Karpathy, "Deep Visual-Semantic Alignments," 2015.
- [12] S. K. B. N. Patro, "Multimodal Differential Network for Visual Question Generation," 2018.
- [13] D. Wang, X. Liu and J. Liu, "The effects of social media on brand awareness and brand equity," 2019.
- [14] H. Kim and Y. Sung, "Social media analytics of consumer sentiment for fashion brands," 2018.
- [15] X. Li, X. Zhao and F. & Xue, "Social usage in supply chain management," 2020.
- [16] N. Nizamuddin, S. S. Hishan and N. H. & Moin, "Social media in supply chain management," 2019.
- [17] Y. Hou and Y. & Huang, "Customer engagement with brands in social media," 2017.
- [18] N. Sahoo and S. & Nanda, "Social media marketing for customer engagement," 2021.
- [19] C. F. C. & M. S. Anderson, "Customer Satisfaction and Shareholder Value. Journal of Marketing Research," 2014.
- [20] J. & M. D. Chevalier, "The Effect of Word of Mouth on

Sales: Online Book Reviews. Journal of Marketing Research," 2006.

- [21] V. A. L. D. B. V. R. W. T. & T. S. Kumar, "Undervalued or Overvalued Customers: Capturing Total Customer Engagement Value. Journal of Service Research," 2016.

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